Summary of Combustion Turbine (MACT)

Presented by Racqueline Shelton, EPA, at National CHP Turbine Technology and Regulatory Forum, March 6, 2003

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Reduction and Cost

- Proposed rule estimated to reduce total HAP (formaldehyde, acetaldehyde, benzene, and toluene) emissions by 81 tons/yr in the 5th year.
- Total annualized cost of $21.5 million in the 5th year.
- Proposed rule will also reduce criteria air pollutant emissions, primarily CO emissions.

Applicability

- The rule will apply to each stationary combustion turbine (CT) with a rated peak power output equal to or greater than 1.0 MW located at major sources. The rule does not apply to stationary CTs located at an area source of HAP emissions.
- Existing diffusion flame combustor (DFC) turbines have no requirements.
- The following types of turbines do not have emission limitations, but new turbines must submit an initial notification
  - An emergency stationary CT
  - A stationary CT burning landfill gas or digester gas as its primary fuel
  - A limited use stationary CT (operated $\leq$ 50 hours per year)

Potential Affected Sources

- Total Existing: 800 lean premix combustor (LPC) turbines of which 160 will be affected (located at major HAP sites).
- Total New: 771 of which 155 will be affected (located at major HAP sites) by end of 5th year after promulgation. Based on information from turbine manufacturing industry, state permit data, and Gas Turbine World 1999-2000 Handbook.
- Estimate 20% of existing and new turbines will be located at sites that are major for HAP.

Emission Limitations

- You must meet one of the following emission limitations:
  - Reduce CO emissions in the turbine exhaust by 95%, if you are using an oxidation catalyst emission control device, or
  - Reduce the concentration of formaldehyde in the turbine exhaust to 43 ppbvd or less, at 15% O_2, if you use means other than an oxidation catalyst emission control device.

Operating Limitations

- If you comply with the emission limitation for CO reduction, or if you comply with the emission limitation for formaldehyde and your turbine is LPC:
  - No operating limitations.
- If you comply with the formaldehyde emission limitation and your turbine is not LPC:
  - Petition Administrator for approval of (no) operating limitations.

Testing/Monitoring

- Turbines complying with the emission limitation for CO reduction:
  - Install CEMS to measure CO and either CO_2 or O_2 simultaneously at the inlet and outlet of the oxidation catalyst emission control device.
  - Initial performance evaluation of CEMS using Performance Specifications 3 and 4A of 40 CFR part 60, appendix B.
  - Initial demonstration of 95% CO reduction using the first 4-hour average after a successful performance evaluation. Your inlet and outlet measurements must be on a dry basis and corrected to 15% O_2 or equivalent CO_2 content.
  - Yearly RATA of the CEMS using Performance Specifications 3 and 4A of 40 CFR part 60, appendix B.

Testing/Monitoring (cont'd)

- New or reconstructed LPC or DFC turbines or existing LPC turbines complying with the emission limitation for formaldehyde:
  - Initial performance test using Method 320, ARB Method 430, SW-846 Method 0011, or proposed Method 323 (if natural gas-fired source) to demonstrate that the outlet concentration of formaldehyde is 43 ppbvd or less at 15% O_2.
  - Correct to 15% O_2, dry basis, by measuring O_2 using Method 3A or 3B of 40 CFR part 60, appendix A, and moisture using Method 4 of 40 CFR part 60, appendix A.
  - Meet low NOx emission levels required by federally enforceable permit (or guaranteed by turbine manufacturer if no permit level).
    - Enforcement authority can request formaldehyde test if LPC NOx levels are not being met

Testing/Monitoring (cont'd)

- New or reconstructed turbines that are not LPC turbines complying with the emission limitation for formaldehyde:
  - Initial performance test using Method 320, ARB 430, SW-846 Method 0011, or proposed Method 323 (if natural gas-fired source).
  - Petition Administrator for approval of operating limitations or no operating limitation.
  - Petition for approval of operating limitations should include:
    - Parameters proposed as operating limitations,
    - Relationship between parameters and HAP emissions,
    - How upper and/or lower values for parameters will be established,
    - Methods to measure and instruments to monitor parameters, and
    - Frequency and methods for recalibrating instruments.
  - Petition for approval of no operating limitations should include a similar discussion in addition to a discussion of why it is infeasible or unreasonable to adopt these parameters as operating limitations.

Dual Fuel

- Usually fitted with two combustion systems, an LPC for burning natural gas and a DFC for burning diesel.
- Existing DFC turbines: No emission limitations.
- Existing LPC turbines: Have emission limitations.
- All new turbines (DFC + LPC): Have emission limitations.
- Most new DFC turbines will have to install oxidation catalyst controls to meet the applicable emission limitation.
- Most LPC turbines will be able to meet the applicable emission limitation without the use of add-on controls.

Dual Fuel (cont'd)

- Estimate approximately 45% of the new turbines being constructed will have dual fuel capability.
- Limited use turbines (<50 hrs/yr): No emission limitations.
- LPC turbines which are dual fuel capable would most likely not have to install an oxidation catalyst control system unless they are permitted to operate more than 50 hours per year on diesel.
- Believe that most owners or operators of LPC turbines will choose not to install add-on controls to operate on diesel.
- Assumption that the natural gas supply will be adequate and the cost on a heat content basis will be lower than or competitive with diesel fuel.
- We solicited comments on this assumption.

Solicited Comments

- Create subcategory of limited use CTs with capacity utilization ≤10% (≤876 hrs/yr) at 100% load. Subcategory would include CTs used for electric power peak shaving that are called upon to operate fewer than 876 hrs/yr.
- Agency has received petition requesting that natural gas fueled combustion turbines be delisted.
- Performance capabilities of CO CEMS to measure the low concentrations of CO in the exhaust of a stationary CT following an oxidation catalyst emission control device.
- Revisions to Method 320 of 40 CFR part 63, appendix A, to ensure accurate measurement of low concentrations of formaldehyde.
- Proposing Method 323 of 40 CRFR part 63, appendix A for measuring formaldehyde from natural gas fired combustion turbines.

Solicited Comments (cont'd)

- Requesting comments on further ways to structure the rule to focus on sources that pose significant risk and avoid high costs on sources posing little risk.
- Seeking comment on three approaches:
  - Applicability cutoff for threshold pollutants
  - Subcategorization and delisting
  - Concentration-based applicability threshold

Information and Contact

- Promulgation by August 31, 2003
- Information on the MACT rulemaking for combustion turbines is available on EPA's Web site at:
  - www.epa.gov/ttn/atw/combust/list.html
- Online public docket for CT MACT:
  - http://cascade.epa.gov/RightSite/dk_public_home.htm
- Contact:
  - Sims Roy
  - 919-541-5263
  - roy.sims@epa.gov